

REMARKS

This Amendment is responsive to the final Office Action dated June 18, 2003, and the personal interview of September 16, 2003. For the following reasons, this application is in condition for allowance and should be passed to issue. No new matter is introduced by this amendment. Figs. 1 and 6, and the written description at page 6, lines 10-13, clearly disclose that the high heat conductor film 6 is formed in a predetermined area including an area above the resistor film 3.

Claims 2-6 are pending. Claims 2, 3, 5, and 6 are rejected. Claim 4 is objected to as being dependent upon a rejected base claim. Claims 2 and 6 have been amended, and claim 1 has been cancelled.

Interview Summary

Applicant thanks Examiner Vu and Supervisory Examiner Hu for their courtesy of granting a personal interview with the undersigned on September 16, 2003. During the interview, the Examiners agreed that silicon oxide insulating films would not be considered high heat conductor films by one ordinary skill in this art. However, the Examiners pointed out that wiring layer 11 of Usami could be considered a high heat conductor film.

Rejections Under 35 USC § 102

Claims 2, 3, 5, and 6 are rejected under 35 USC § 102(e) as being anticipated by Usami (6,194,775). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison of the instant invention and the cited prior art.

An aspect of the invention, per claim 2, is a semiconductor device comprising a semiconductor substrate and a first insulating film formed on the semiconductor substrate. A polysilicon resistor film is formed on the first insulating film. A second insulating film is formed on the resistor film. A high heat conductor film consisting of a highly heat-conducting material is formed on a second insulating film. The high heat conductor film is formed in a predetermined area, including an area above the resistor film. A pair of terminal wirings are formed on the second insulating film and connected to the resistor film. The thickness of the high conductor film is thicker than a thickness of the resistor film.

Another aspect of this invention, per claim 6, is a semiconductor device, comprising a semiconductor substrate and a first insulating film formed on said semiconductor substrate. A polysilicon resistor film is formed on the first insulating film and a second insulating film is formed on the resistor film. A high heat conductor film consisting of a highly heat-conducting material is formed on the second insulating film. The high heat conductor film is formed in a predetermined area, including an area above the resistor film. A pair of terminal wirings are formed on the second insulating film and are connected to the resistor film. A thickness of the second insulating film is thinner than a thickness of the resistor film, and a thickness of the high heat conductor film is thicker than a thickness of the resistor film.

The Examiner asserts that Usami teaches the semiconductor device, including a semiconductor substrate 1, a first insulating film 2, a polysilicon resistor film 6, 7, a second insulating film 9, a high heat conductor film 13, and a pair of terminal wirings 11, 12.

Contrary to the Examiner's assertion, Usami does not disclose the claimed semiconductor device. Usami does not disclose the high heat conductor film consisting of a

highly heat-conducting material formed on the second insulating film, wherein the high heat conductor film is formed in a predetermined area including an area above the resistor film, as required by claims 2 and 6. As acknowledged by the Examiner, the asserted high heat conductor film 13 is an **insulating film**. An insulating film, particularly a silicon oxide film, would not be considered a high heat conductor film by one of ordinary skill in this art. One of ordinary skill in this art would understand that an insulating film is the opposite of a conductor film.

The Examiner asserts that "it is inherent that the insulating film (13) is a high heat conductor film." The Examiner provides no **factual** basis for this assertion of inherency. There is no teaching in Usami that the insulating film 13 is a high heat conductor film, nor is there any teaching in Usami that silicon oxide is a highly heat-conducting material. One of ordinary skill in this art would recognize that silicon oxide is an insulating material. Likewise, one of ordinary skill in this art would understand silicon oxide as a film to be an electrically insulating film, tending not to be of high heat conductivity, as acknowledged by the Examiners during the personal interview of September 16, 2003.

The Examiner cites Pezzani (U.S. Patent No. 6,411,155) as allegedly teaching that "silicon oxide is [a] good heat dissipation [layer]." The Examiner, however, has misconstrued the teaching of Pezzani. Contrary to the Examiner's assertion, Pezzani does not disclose that "silicon oxide is [a] good heat dissipation [layer]." Pezzani teaches that good heat dissipation is obtained by components that have their bottom surfaces **metallized** (column 1, lines 22-27; column 2, lines 36-43). Metals generally have high thermal conductivity and good heat dissipation. The thin silicon oxide layer taught by Pezzani is

presumably applied to prevent the metallization layer from short circuiting the component.

As explained *infra*, silicon oxide layers have low thermal conductivity.

The Examiner's assertion that it is inherent that the insulating film 13 is a high heat conductor film is not supported by any factual basis. "In relying upon a theory of inherency, the examiner must provide a rational basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). MPEP § 2112. The Examiner has not shown that the allegedly inherent characteristic (highly heat conducting) necessarily flows from the teaching of Usami. As described in Usami, the silicon oxide film is an insulating film.

A silicon oxide insulating film, as would be readily apparent to one of ordinary skill in this art, is not a high heat conductor film. It would be readily apparent to one of ordinary skill in this art that a silicon oxide film is a **low** heat conductor film. As described in *Hawley's Condensed Chemical Dictionary* (attached to response filed April 14, 2003), silica (silicon dioxide) has a thermal conductivity about half of that of glass, and glass has **low** thermal conductivity. It is clear that the silicon oxide insulating film 13 of Usami is a **low** heat conductor film, not a high heat conductor film.

In addition, Usami does not teach a high heat conductor film that is formed in a predetermined area including an area above the resistor film, as required by claims 2 and 6. As illustrated in Usami, wiring layer 11 is not formed in an area above resistor film 7, rather wiring layer is formed in area offset from the area above resistor film 7.

The factual determination of lack of novelty under 35 USC § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-*

Lok Ltd., 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Usami does not teach the high heat conductor film formed in a predetermined area including an area above the resistor film, as required by claims 2 and 6, therefore Usami does not anticipate claims 2 and 6. Applicant submits that the rejection of the claims as anticipated by Usami should be withdrawn.

Applicant further submits that the claimed semiconductor device is not suggested by Usami.

Applicant has thoroughly rebutted the Examiner's assertion that the insulating film 13 of Usami is inherently a high heat conductor film. The Examiner has provided no support at all for the assertion that the insulating film 13 is inherently a high heat conductor film, other than the following unsupported, conclusory statements:

"It is inherent that the insulating film (13) is a high heat conductor film consisting of a highly-heat conducting material (silicon oxide) . . ." (pages 2 and 3 of the Office Action);

"Usami teaches the insulating film (13) is a high heat conductor film consisting of a highly heat-conducting material (silicon oxide) . . ." (page 4 of the Office Action); and

"the silicon dioxide is good heat dissipation as taught by US Patent No. 6,411,155 to Pezzani (column 2, lines 37-43)."

The Examiner does not cite any portion of Usami as supporting these assertions. As explained, *supra*, Pezzani teaches that it is the metallization of the components that provides good heat dissipation. The Examiner has not provided any support for the assertion that silicon oxide insulating films are high heat conductor films. Applicant, on the other hand, has conclusively established that **silicon oxide films are low heat conductor films**. Furthermore, Applicant has shown that wiring layer of Usami 11 is not formed in an area above resistor film 7. Therefore, it is clear that the rejection of claims 2, 3, 5, and 6 as anticipated by Usami under 35 U.S.C. § 102 is clearly erroneous and should be withdrawn.

The dependent claims further distinguish the claimed invention over Usami. Claim 3 for example, requires that the thickness of the high heat conductor film is twice the thickness of the resistor film or thicker, and claim 5 requires that the high heat conductor film is united with one of the terminal wirings.

Allowable Subject Matter

Claim 4 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form.

Applicant gratefully acknowledges the indication of allowable subject matter. Because independent claim 2 is allowable, as explained *supra*, it is not believed to be necessary to place claim 4 in independent form.

In light of the amendments and remarks above, this application is in condition for allowance, and the case should be passed to issue. If there are any questions regarding this Request for Reconsideration or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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